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United States Department of Agriculture
Bureau of Entomology and Plant Quarantine

AN ADJUSTABLE NOZZLE FOR USE IN BARK
BEETLE CONTROL WORK

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When a tree has been successfully attacked by bark beetles, its life can not be saved. Consequently the prevention of timber losses resulting from attacks of these beetles is based upon the destruction of the insect broods beneath the bark, to prevent their emergence and subsequent attack of other trees. In combating outbreaks of the mountain pine beetle (Dendroctonus monticolae Hopk.) in lodgepole pine two methods of treating standing trees are now in general use. With one the infested portion of the bole is sprayed with an inflammable oil and burned. When this method is properly performed, the temperatures that are developed beneath the bark are lethal to all insect life. With the other the same technique is employed to cover the infested bole with a spray which penetrates the bark and kills the insect brood beneath. Both methods require that the infested portion of the bole be properly sprayed, and when the infestation extends to such a height that this can not be done the trees must be felled for subsequent treatment.

The equipment used in applying these sprays consists of a small, portable, 3½-gallon, compressed-air sprayer, a telescopic extension spray rod,^{2/} and a special nozzle with an aperture of 0.052 inch which provides a small solid stream necessary to prevent waste. Efficient use of this equipment depended upon a nozzle which could be adjusted to a fine spray to treat the lower bole and still have a solid stream available with which to reach the upper heights of infestation. To meet this requirement an attachment for the special nozzle (fig. 2, I) was developed which enabled

^{1/} The writer is indebted to T. T. Terrell, Forest Insect Laboratory, Coeur d'Alene, Idaho, and to the Gorman Lock and Machine Shop for valuable assistance in the development of this nozzle.

^{2/} Evenden, J. C. A Telescopic Spray Extension Rod for Use in Bark Beetle Control Work. Bur. Ent. and Plant Quar., ET-142. March 1939.

the operator to make an instant change from the spray to the solid stream or from the stream to the spray, although the extension rod was fully extended.

This attachment is easily fitted to the special nozzles, and when set with the weighted arm (fig. 1) lying horizontally over the extension rod, the stream strikes the oval deflection plate (fig. 2, D) and is broken into a fan-shaped spray. By flipping the extension rod the weighted lever is thrown to the left (figs. 3 and 4) and thus removes the deflector from the course of the stream.

The different parts (fig. 2) used in the construction of this attachment are not expensive or difficult to make. The bearing A for the lever rod C is a piece of $\frac{1}{4}$ -inch copper tubing $2\frac{3}{8}$ inches long, pressed together on one side to provide rigidity. This bearing is soldered to the clamps E and F so that it will cross the axis of the nozzle (fig. 3) at a slight angle. The lever C is a piece of bronze soldering rod $\frac{1}{8}$ inch in diameter and approximately $4\frac{3}{4}$ inches long. The washer B is soldered to the lever rod (fig. 4) to provide a turning surface and to prevent the rod from slipping forward in the bearing. The deflector plate D, which is of 24-gauge sheet brass and twisted as shown in the illustrations, is set at a slight angle (fig. 3) to the bore of the nozzle, so that the stream strikes the plate a trifle below the center. The face of the plate is slightly oval or rounded transversely, to produce the desired fan-shaped spray, which gives adequate coverage with a once-over sweep.

Explanation of Illustrations

Figure 1.--Nozzle and attachment set so as to break the small stream into a fan-shaped spray.

Figure 2.--Unassembled attachment.

Figure 3.--Front of nozzle and attachment, showing construction.

Figure 4.--Side view of nozzle and attachment.

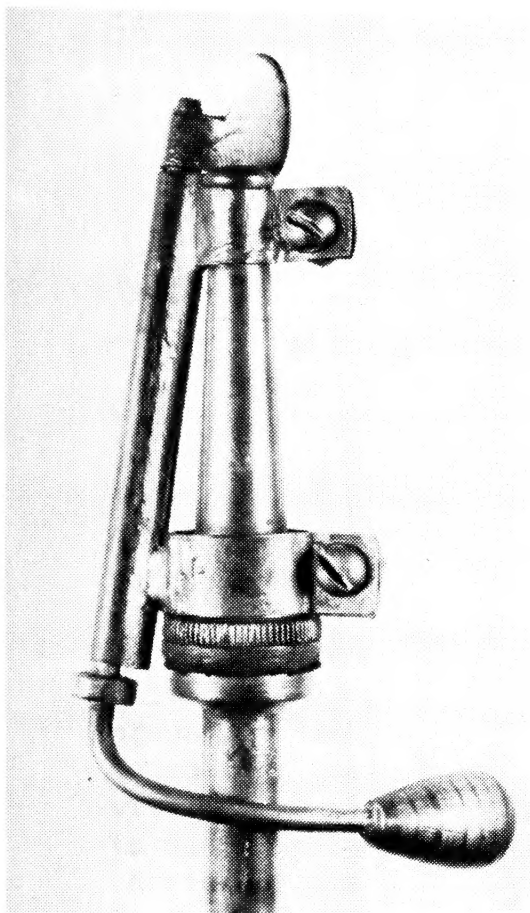


Figure 1

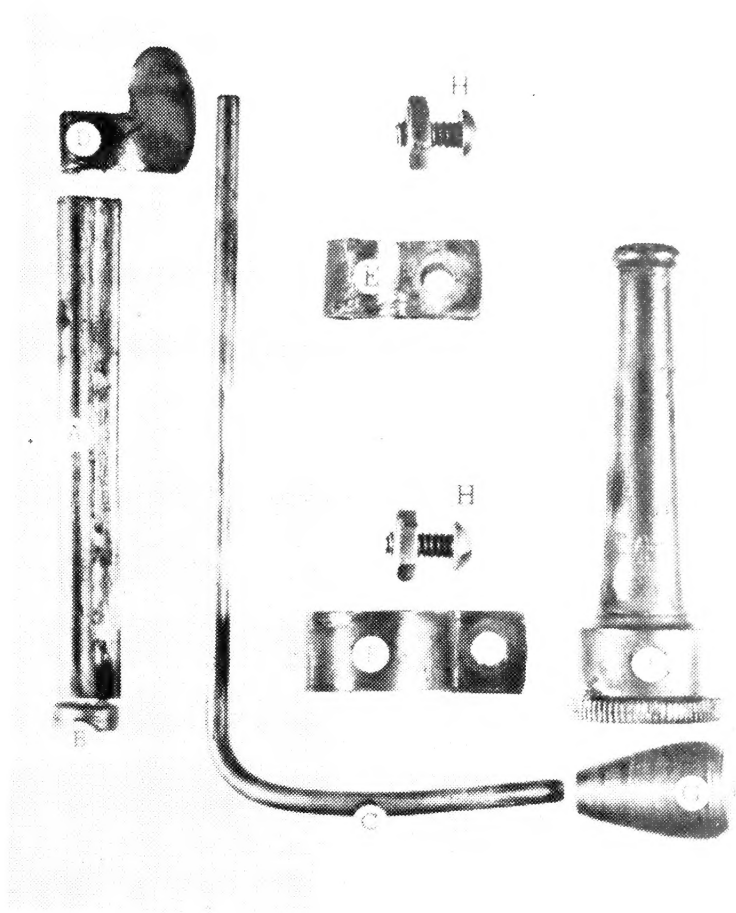


Figure 2

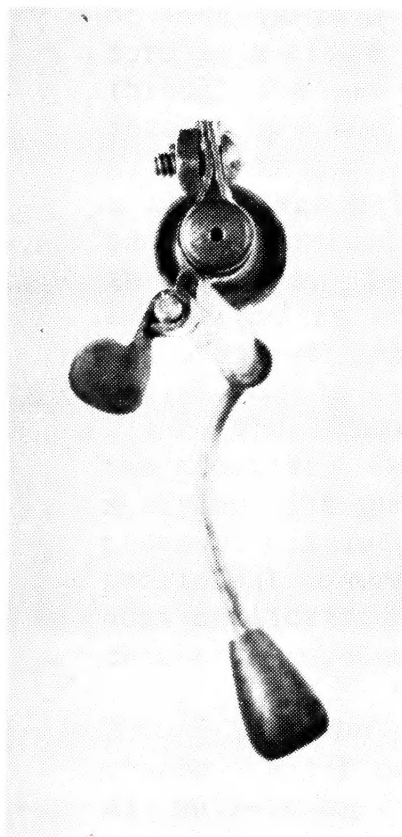


Figure 3

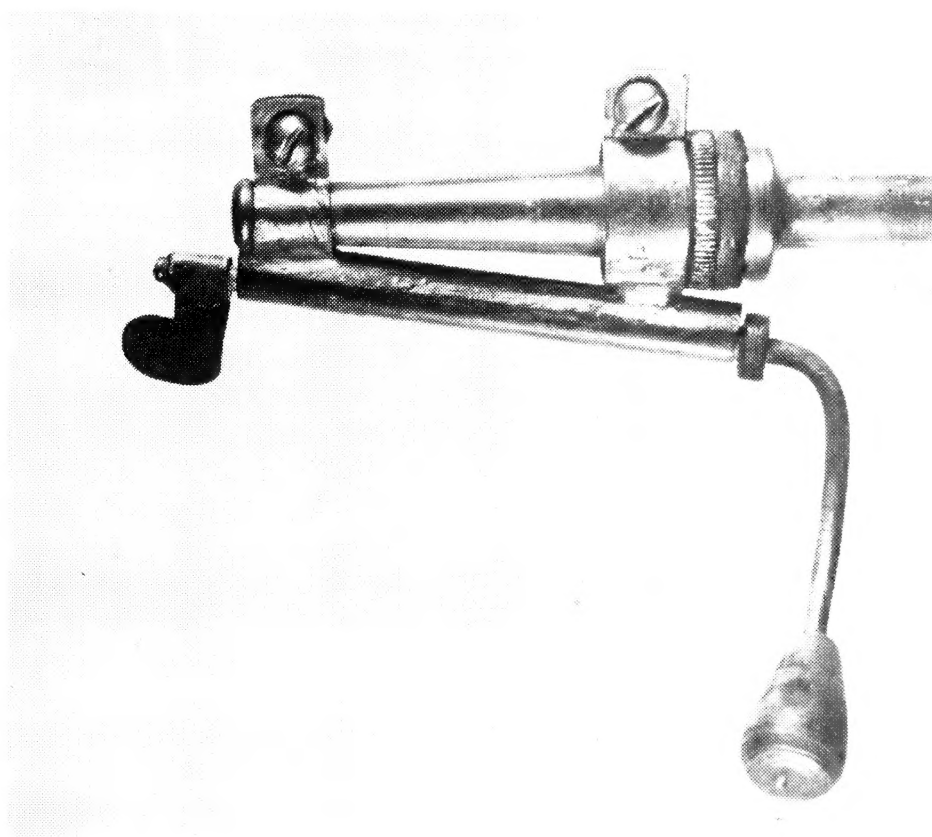


Figure 4

